



# Naxos Crystallina White

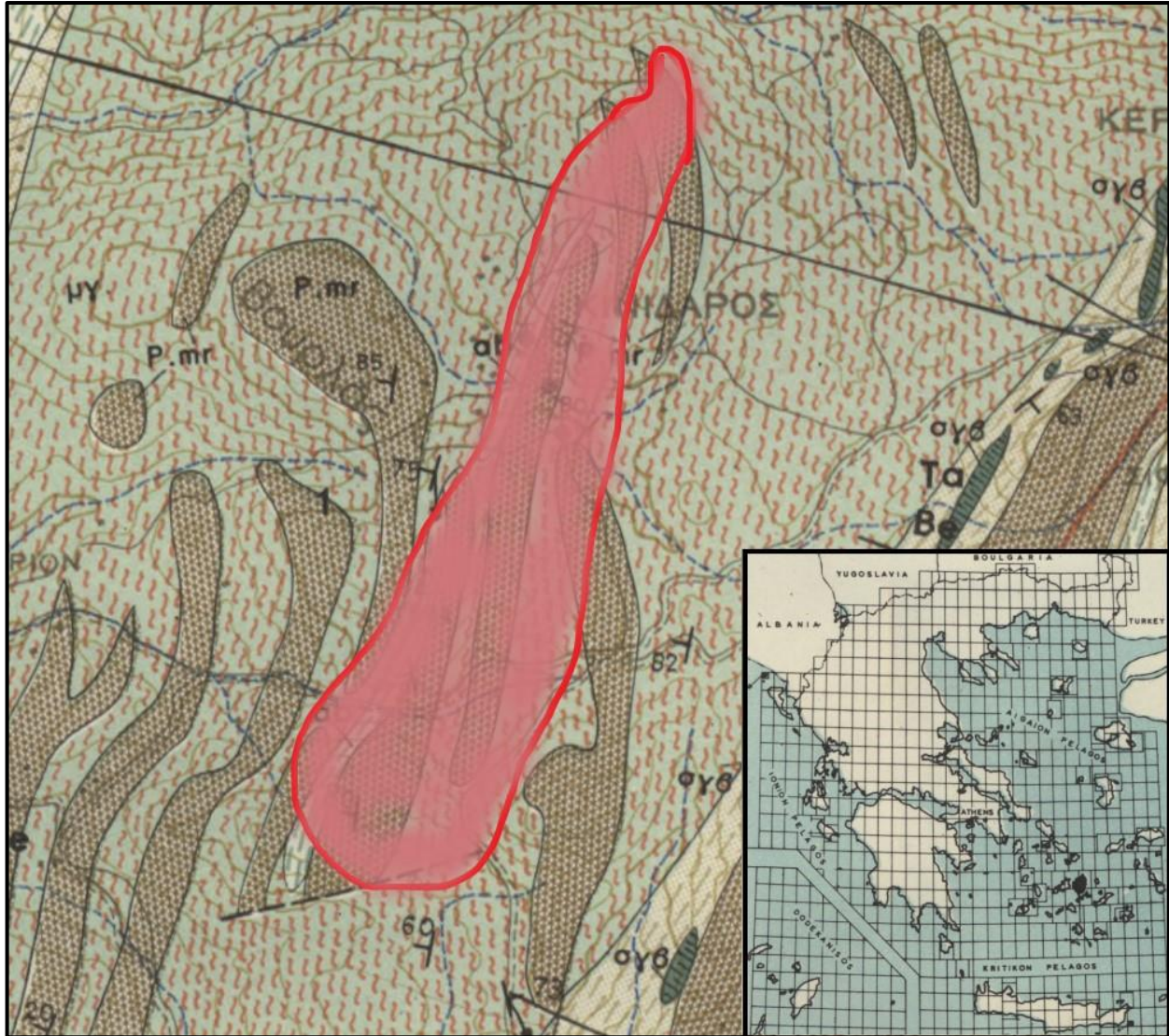


Scale 1:1

**Short description:** White coarse-grained calcitic marble with large crystals.

Commodity (vocabulary)	Lithology (vocabulary)	Typical colour (code list)	Place of origin			
			Country	County / District / Province	Municipality / Community	Place/town / Village
Marble	Calcitic marble	White	Greece	South Aegean	Naxos	Naxos

# Geological setting



**Geology:** Naxos Crystallina White (red marking) belongs to the marbles of metamorphic complex, coarsely crystalline and white, containing intercalations of carbonate schists, amphibolites and biotite-hornblende gneisses. In the stratigraphically higher parts of the metamorphic sequence the marbles are finer grained. All the marbles exhibit rather rapid lateral changes in thickness and composition, and most of them, apart from those in the migmatite, contain numerous occurrences of emery or diasporite which often seem to be concentrated in certain horizons.

(Source: Geological Map of Greece 1:50000, Island Naxos)

**Production:** The most important quarry area is near Kinidaros village in Naxos Island.

**Geological age:** Pre-Permian

**Geological unit:** Metamorphic Complex

# Application, use and heritage

**Description:** Naxos Crystallina marble shines in the sun and testifies to the long history of Naxos island. Naxos marble is durable and less prone to leak stains due to its low porosity. It is used for various interior and exterior decorations, such as tiles, building facades, floors, stairs and works of art. It is also used for the restoration of Archaeological Monuments.



Restoration of the Tholos in the Sanctuary of Asklepios Epidaurus.

(Source: [http://odysseus.culture.gr/h/3/eh351.jsp?obj\\_id=2374](http://odysseus.culture.gr/h/3/eh351.jsp?obj_id=2374))



Restoration of the monuments of Carthaea: It was conducted by the Greek Ministry of Culture through the Committee for the “Conservation and Restoration of ancient Karthaia on Keos” in the years 2002-2008 and 2011-2015. The projects have been financed by the European Union. Work has been carried out on the temples of Apollo and Athena, on the Propylon, the Building D, the theater, and on their immediate surroundings.

(Source: Wikipedia)



Restoration of the Ancient Sanctuary of Apollo and Demeter at Fyroulas, Sagri, Naxos.

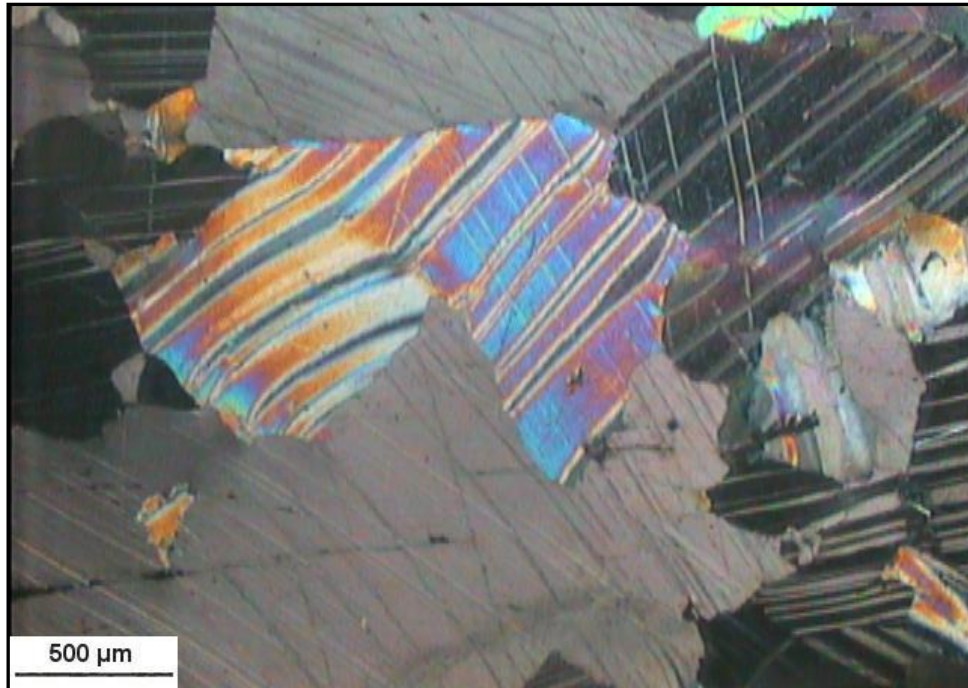
(Source: <https://www.naxos.gr/the-ancient-sanctuary-of-apollo-and-demeter-at-gyroulas-sagri/?lang=en>)



The **Kouros of Apollonas**, also called the **Colossus of Dionysus**, is a 10.7 metre tall unfinished statue of Naxian marble with a weight of around 80 tonnes. It is located in an ancient quarry near Apollonas, a small town in the northern part of Naxos, one of the Cycladic Islands in the Aegean Sea. The statue is a kouros dating from Archaic period of Ancient Greece, around the turn of the seventh and sixth centuries BC.

(Source: [https://en.wikipedia.org/wiki/Kouros\\_of\\_Apollonas](https://en.wikipedia.org/wiki/Kouros_of_Apollonas))

# Petrography



**Description:** Photomicrograph of thin section, showing hypidiomorphic calcite crystals, triple junction grain boundary contacts and “curved borders”. Genuiculate twinning is also illustrated, as a result of tectonic processes.

**Source of information:** Hellenic Survey of Geology and Mineral Exploration

# Mineral composition

If no accurate number, use MM=main minerals, SM = Subordinate minerals, AM=accessory minerals

<b>Calcite (%)</b>						
100						

**Source of information:** Hellenic Survey of Geology and Mineral Exploration

# Physical properties

Apparent density (EN 1936) kg/m <sup>3</sup>	Open porosity (EN 1936) % vol	Water absorption at atmospheric pressure (EN 13755) % wt	Uniaxial Compressive strength (EN 1926) MPa	Flexural strength under concentrated load (EN 12372) MPa
2710	0,3	0,1	86	9,5

Real density (EN 1936) kg/m <sup>3</sup>	Total porosity (EN 1936) % vol	Water absorption coefficient by capillary (EN 1925) (g/m <sup>2</sup> x s <sup>0,5</sup> )	Flexural strength under constant moment (EN 13161) MPa
-	-		

Frost resistance (EN 12371)				
Technological Test (Test A)				Identification Test (Test B): Number of cycles completed prior to stone failure
Flexural strength (EN 12372) after freeze-thaw cycling, MPa	Number of cycles	Uniaxial compressive strength (EN 1926) after freeze-thaw cycling, MPa	Number of cycles	
8,3	48			

Resistance to ageing by thermal shock (EN 14066)			
Change in dynamic modulus of elasticity (increase: +; decrease: -) %	Change in open porosity (increase: +; decrease: -) %	Change in ultrasound pulse velocity (increase: +; decrease: -) %	Change in flexural strength under conc. load (increase: +; decrease: -) %
-		-	

Abrasion resistance (EN 14157)			Resistance to salt crystallisation (EN 12370)	Breaking load at dowel hole (EN 13364)	
Method A - Wide Wheel Abrasion Test, mm	Method B - Böhme Abrasion Test, cm <sup>3</sup> / 50cm <sup>2</sup>	Method C - Amsler Abrasion Test, mm	Change in mass (increase: +; decrease: -), %	Breaking load, N	Thickness of the test specimens, mm
-	17	-	-	1500	3

Slip resistance by means of the pendulum tester (EN 14231 / CEN/TS 16165)			Rupture energy (EN 14158), Joule	Thermal Conductivity (EN 1745), W/m·K
Tested surface finish	Slip Resistance Value — SRV			
	Dry test condition	Wet test condition		
			4	-

**Source of information:** Hellenic Survey of Geology and Mineral Exploration

# Chemical properties

## Main elements

SiO <sub>2</sub> (%)	Al <sub>2</sub> O <sub>3</sub> (%)	Fe <sub>2</sub> O <sub>3</sub> (%)	TiO <sub>2</sub> (%)	MgO (%)	CaO (%)	Na <sub>2</sub> O (%)	K <sub>2</sub> O (%)	MnO (%)	P <sub>2</sub> O <sub>5</sub> (%)	SO <sub>3</sub> (%)	LOI (%)
<0,05	<0,05	<0,05	<0,05	0,25	54,80	1,10	0,27	<0,05	-	-	43,05

## Trace elements

V (ppm)	Cr (ppm)	Mn (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)
Sr (ppm)	Cd (ppm)	Ba (ppm)	Pb (ppm)	Be (ppm)	Rb (ppm)	Bi (ppm)	U (ppm)
Sc (ppm)	Y (ppm)	Th (ppm)	Sb (ppm)	Ta (ppm)	Nb (ppm)	Zr (ppm)	Sn (ppm)
Ag (ppm)	B (ppm)	Mo (ppm)	W (ppm)	Ga (ppm)	Ge (ppm)	Se (ppm)	Cs (ppm)
Tl (ppm)							


## REE

La (ppm)	Ce (ppm)	Pr (ppm)	Nd (ppm)	Sm (ppm)	Eu (ppm)	Gd (ppm)	Tb (ppm)
Dy (ppm)	Ho (ppm)	Er (ppm)	Tm (ppm)	Yb (ppm)	Lu (ppm)		

**Methods applied and source of information:** Hellenic Survey of Geology and Mineral Exploration

# Sources of more information

Type of information	Name of provider	URL
This data sheet	Hellenic Survey of Geology and Mineral Exploration	<a href="https://www.eagme.gr/">https://www.eagme.gr/</a>
Non-commercial directory	ΟΔΥΣΣΕΥΣ Ministry of culture and Sports	<a href="http://odysseus.culture.gr/h/2/gh251.jsp?obj_id=14321">http://odysseus.culture.gr/h/2/gh251.jsp?obj_id=14321</a> <a href="http://odysseus.culture.gr/h/3/eh351.jsp?obj_id=2374">http://odysseus.culture.gr/h/3/eh351.jsp?obj_id=2374</a>
	Wikipedia	<a href="https://el.wikipedia.org/wiki/%CE%9A%CE%B1%CF%81%CE%B8%CE%B1%CE%AF%CE%B1#/media/%CE%91%CF%81%CF%87%CE%B5%CE%AF%CE%BF:Kart_haia_upper_plateau.JPG">https://el.wikipedia.org/wiki/%CE%9A%CE%B1%CF%81%CE%B8%CE%B1%CE%AF%CE%B1#/media/%CE%91%CF%81%CF%87%CE%B5%CE%AF%CE%BF:Kart_haia_upper_plateau.JPG</a> <a href="https://en.wikipedia.org/wiki/Kouros_of_Apollonas">https://en.wikipedia.org/wiki/Kouros_of_Apollonas</a>
Commercial directory		
Scientific publication		
Other publication	Naxos and Small Cyclades	<a href="https://www.naxos.gr/the-ancient-sanctuary-of-apollo-and-demeter-at-gyroulas-sagri/?lang=en">https://www.naxos.gr/the-ancient-sanctuary-of-apollo-and-demeter-at-gyroulas-sagri/?lang=en</a>

<b>Compiled by:</b>	<b>Hellenic Survey of Geology and Mineral Exploration (H.S.G.M.E.)</b> <a href="https://www.eagme.gr/">https://www.eagme.gr/</a>	
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